

IMPROVING OPERATIONAL EFFICIENCY, COMPLIANCE AND COMMUNITY PERCEPTION WITH AUTOMATED MONITORING, REPORTING AND REAL-TIME DATA ALARA MADE EASY

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INTRODUCTION - AUTOMATING MONITORING & REPORTING

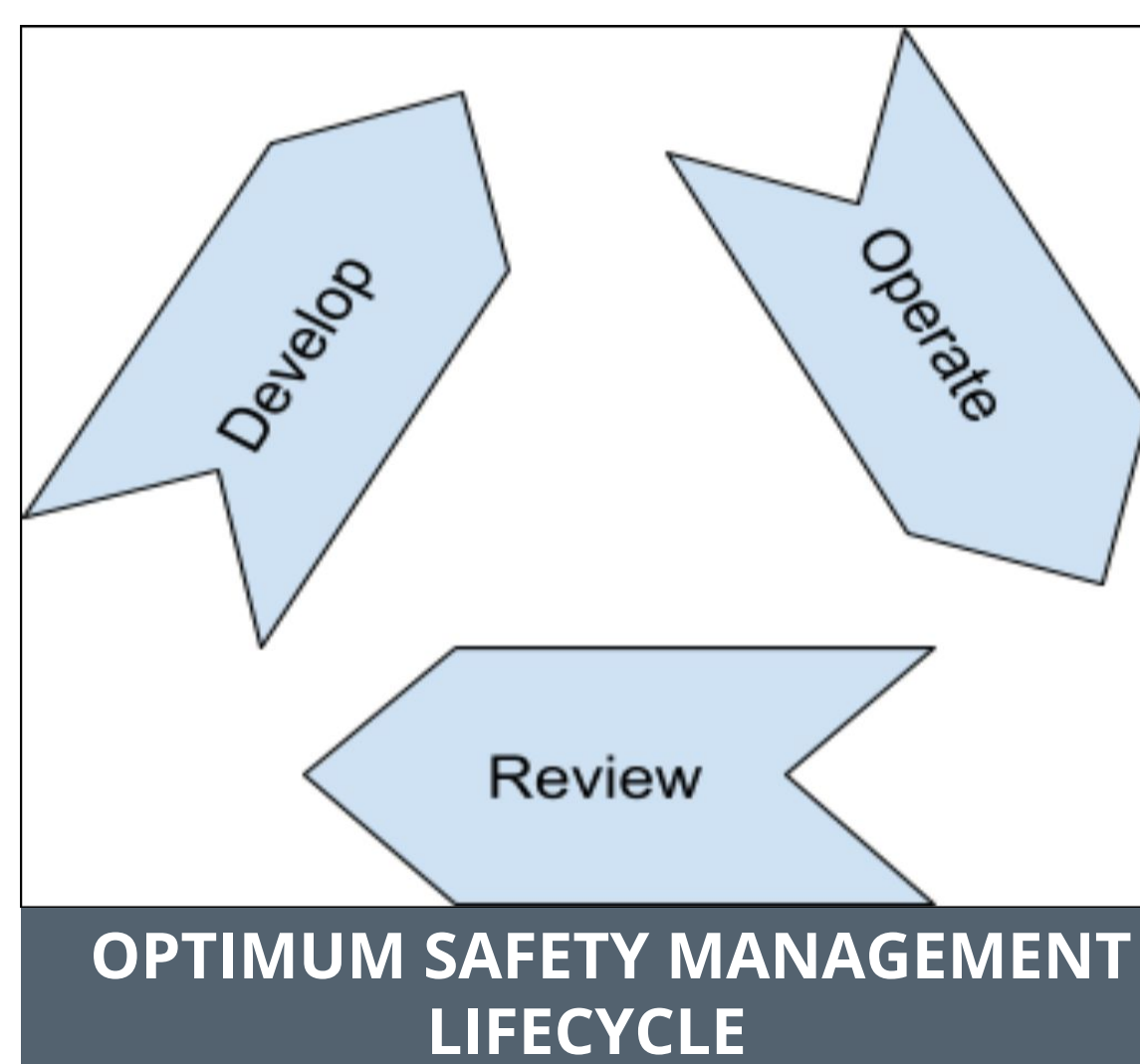
Nuclear power and waste facilities are regularly burdened with exceedingly high requirements for compliance and safety. These are made all the more complex by the size of the organisations and the nature of the hazard to be controlled. Maintaining safety becomes increasingly convoluted as security initiatives operationally take priority or are developed without incorporating safety initiatives.

Whilst security has developed and innovated significantly in the last 30 years, utilising networked security cameras and an array of motion detection sensors, radiation and nuclear safety systems have remained unchanged.

Radiation Safety systems are still made up of safety procedures, paper approval forms, and monitoring technology developed almost a century ago with very little improvements along the way. By developing a new philosophy in the way organisations approach radiation safety, organisations could find significant efficiency gains in operations and security.

Nuclear safety and Nuclear security must be brought into a harmonious and symbiotic interface. This is almost impossible at present as the core techniques of security are digital, and the currently utilised techniques and controls in safety are analogue. By forcing the digital and analogue systems together with administrative control measures, organisations create significant increases in potential for control measure failures.

APPROACHES & CHALLENGES

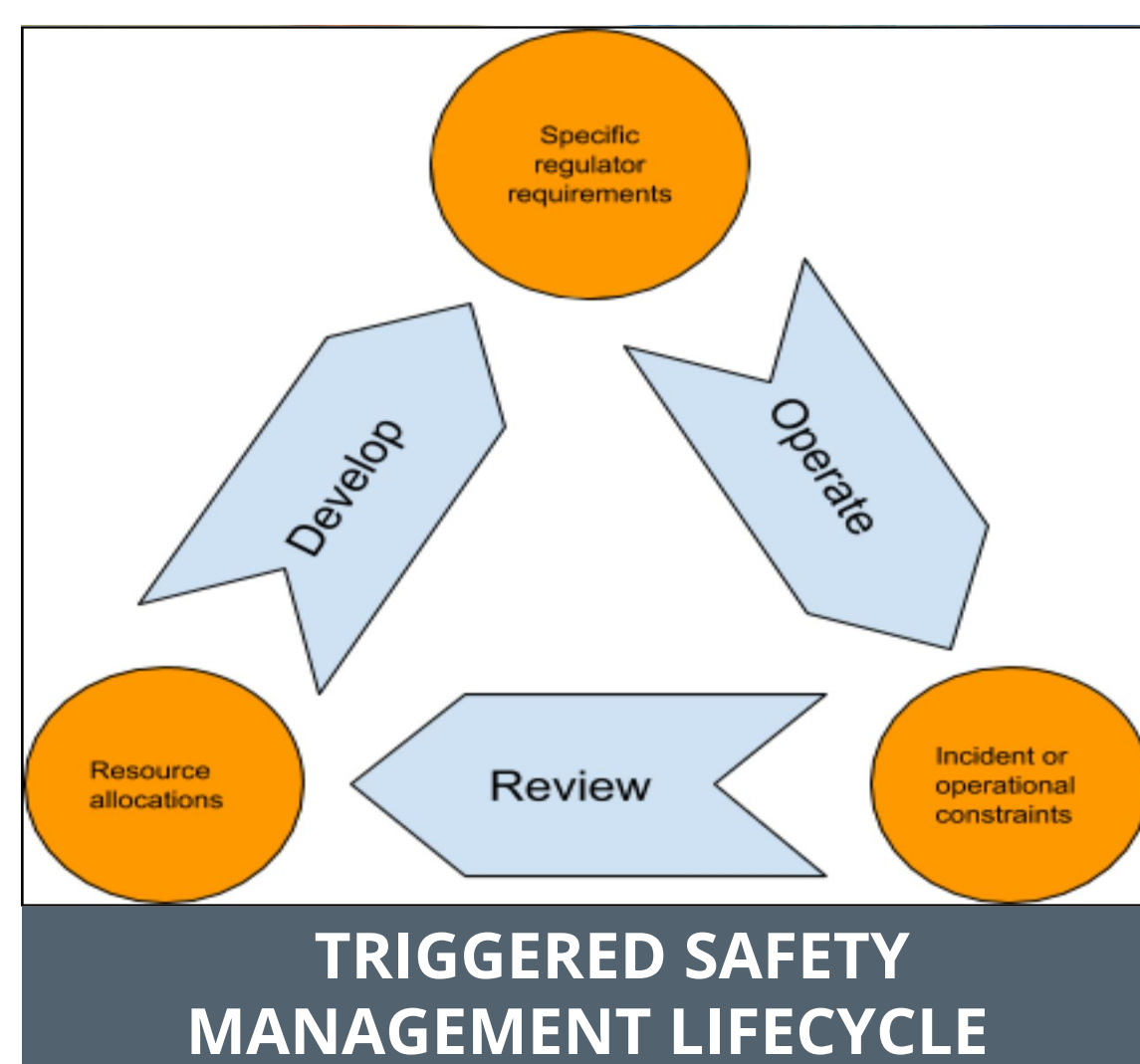


As an organisation considers developing appropriate systems for managing and controlling safety, security and operations we need to be confident any instrument developed is effective for the task. Organisations will regularly spend considerable budget and assign significant personnel resources to tasks involved in activities associated with review and development. For many organisations the ideal safety management process around developing systems is a simple three stage process of; development, operate, review, and repeat until the end of time

Radiation Safety System Development

- Identify risks and hazards
- Identify systems and procedures
- Increase human resources to cover perceived risks
- Identify training requirements
- Assign and track corrective actions
- Reporting

Depending on the resources available to an organisation they may choose an analogue or digital approach at the core of the safety management system to be implemented.



Challenges in the Nuclear Industry

- Contaminated paperwork
- Loss of dosimetry
- Users switching off electronic dosimetry during operation
- Lack of integrated electronic monitoring
- Security of material
- High administrative burden in reporting
- Reduction in available skilled workforce
- Cost of personal dosimetry
- Lack of HR resources in smaller organisations
- Community perception
- Loss of monitoring-manual processing

With increasing complexity and increased operator intervention to maintain the interface between individual control measures, more opportunities for system failure are introduced and the optimum life-cycle of a safety system devolves into a reactive cycle. In this life-cycle each transition to the next phase is triggered by an event or unexpected change. Nuclear facilities in general have significantly complex safety and security elements that must be maintained, and a significant human resource is used to manage the implemented controls.

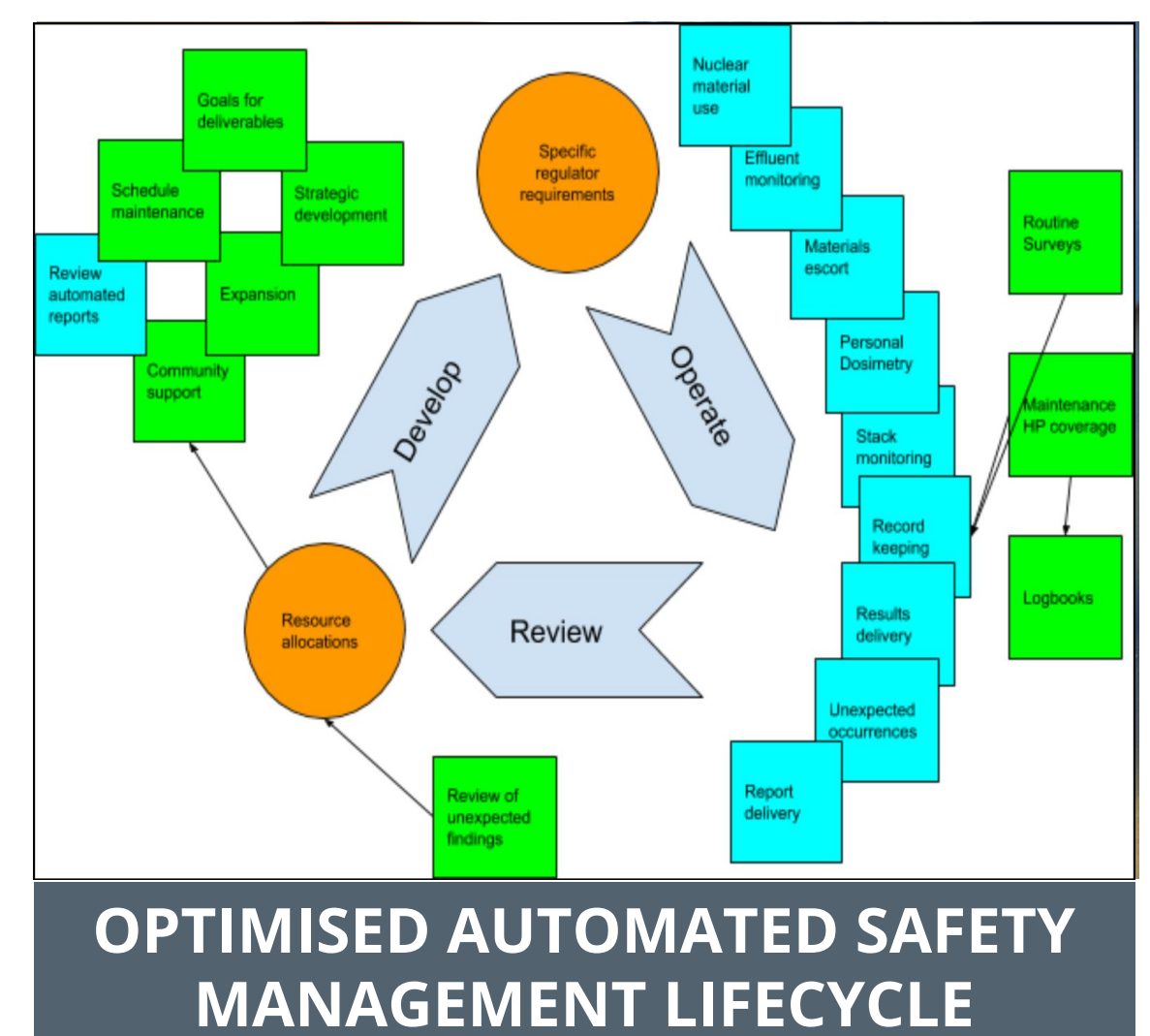


As staff continue to try and operate within an increasingly complex set of systems, overall compliance with control measures will go down as operators become frustrated with the complex operational requirements, and perceived unwillingness of the organisation to advance into modern operating initiatives. In an endeavour to curb this loss of operational safety and security culture, organisations generally introduce an increased training regime and create another level of administration, to ensure culture is developing, which has the outcome of increasing complexity and fostering a culture of shortcuts. This cycle can become exceedingly expensive in development time and ongoing human resource requirements. As the nuclear industry faces a continued reduction in available skilled workforce this isn't ideal.

These challenges are endemic causes of failures within administrative interfaces and operational control measures throughout the developed safety and security systems. These challenges must be addressed at both a foundational and cultural level.

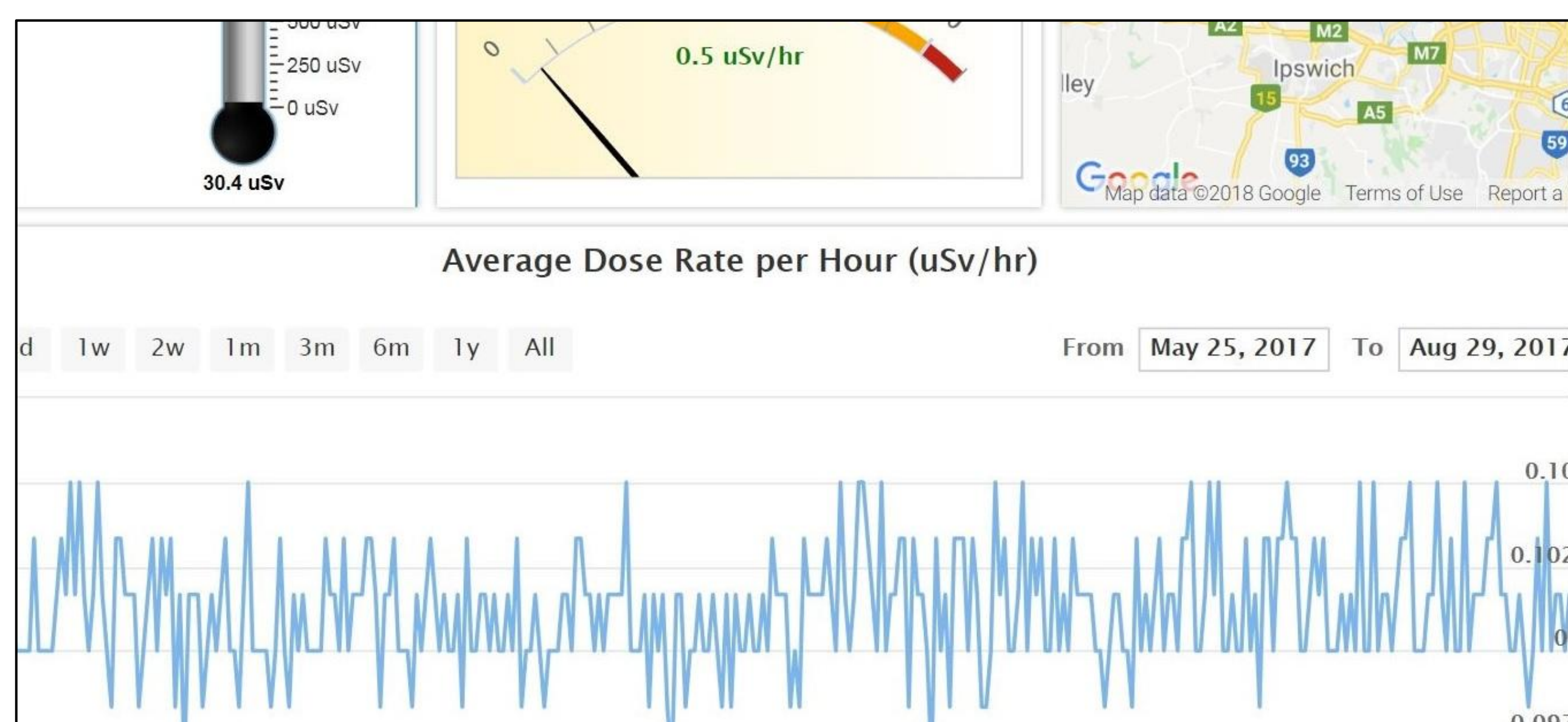


PERCEPTION CHALLENGES



During reporting and review times, a real-time interface displaying current and historic data enables quick review of current and historical projects. The SensaWeb approach automates ALARA assessment delivery without disruptions to operational timeframes, and accessed from any computer or mobile smart device. This connectivity allows any assigned officer to immediately review data for mobile nuclear assets, radiation exposure conditions in a facility or mobilised radiation detection crews as the measurements are being taken. Clear visual displays, such as; year to date exposure and Geographical heat maps, can be automatically produced by the automated safety system. This means that monitoring data and trends can be assessed digitally, with current condition alerts sent immediately to designated responsible individuals, while also generating quarterly and annual dose reports. This same open interface can be utilised to increase staff assurance in their safety, increasing the growth in a strong and robust safety culture. While the controlled and transparent release of data proactively improves public perception.

PRACTICAL IMPLEMENTATION



Emerging data technologies allow us to utilise a fully integrated, organisation level automated solutions, for Radiation, security and operational environment monitoring in Medical, Industrial, Research and Nuclear facilities. By digitally integrating this approach an organisation can significantly decrease the administrative overlap, and potential failure points between the employed control measures. The system should be more than just a platform for displaying real-time radiation data, but should be integrated with automated alerts than assist with security initiatives. The image to the left shows part of the automated monitoring and reporting interface utilised to trial these management improvements. The ideal digitally connected system undertakes operational tracking, review and reporting as part of its general operations.

A safety system that incorporates radiation field, airborne contamination, personal exposure, global positioning, temperature, noise and other environmental sensors to provide a complete understanding of all environmental and potential exposure conditions at a location, within a facility or anywhere a portable asset is currently being transported or utilised. With a range of wall mounted, hand-held, vehicle mounted and wearable real-time connected instrumentation, monitoring and reporting instantly becomes visible and cost effective. Organisations possessing real-time capabilities can track current exposure conditions. Full operational control is thus maintained, enabling maintenance staff rotation in high exposure situations to be managed remotely. The increased locatability of staff wearables, enables immediate identification of a personal dosimeter that has fallen off an operator or has been left in a changeroom. This reduces the potential of false data being recorded.

CONCLUSION

Through utilising real-time radiation monitoring technology an organisation can develop significant operational efficiencies in operational output, safety and security. By automating a significant amount of the routine controls currently performed in an analogue and resource heavy fashion, an organisation can free its most valuable resources to be strategic in their approach to work. Every organisation is required to operate safely, but the approach of developing more controls to manage controls is not effective, and while creating significant operational burden, also creates increased potential for control measure break down.

The streamlining and automation of radiation safety control measures, and integration of these safety controls into security control measures within an organisation, will increase overall control of facilities, resources and assets. This will create a streamlined and less complex approach to safety compliance utilising a digital safety interface. Operators will experience less frustrations and less risk as their operational environment awareness will increase and they will be more assured of their safety, encouraging them to work more effectively.

Real-time monitoring in radiation safety provides unprecedented efficiencies in safety resources, while increasing safety, security and operational awareness. Organisations should be aligning their digital security systems with a digital safety system to reduce risks and enhance security. Beneficial side effects of this technology include greater visibility of data, greater understanding of risks, increased staff assurance, and improved public perception. Real-time monitoring is the current improvement required to harmonise and find efficiencies within the interfaces of safety, security and operations.

This paper is the result of implementation, trials and efficiencies observed in real world operational circumstances utilising the SensaWeb real-time radiation safety instrumentation and reporting interface in conjunction with partner organisations.

